

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Canceled)

2. (Currently Amended) A filter device comprising:

a filter cylinder;

a plurality of hollow fiber membranes, each having a bundled end bundled into a bundled-end diameter and a free end, and said free ends arranged to spread within said filter cylinder;
~~wherein the cylinder has an inner diameter between 1.5 and 3 times the bundled end diameter;~~

injection means for continuously pressure-ejecting raw ~~injecting~~ fluid and gas during a filtering process from ~~from~~ [[to]] a central portion of said plurality of hollow fiber membranes and causing the raw fluid and gas to radiate outwardly from the central portion, ~~thereby injecting the fluid and gas to an interior of said filter cylinder under pressure;~~

a funnel member beneath the plurality of hollow fiber membranes; and

a recovery chamber inside the filter cylinder and below the funnel member,

~~wherein the gas floats within said filter as bubbles and~~ an ejection stream of the raw fluid flutters and spreads said plurality of hollow fiber membranes outwardly, and the gas floats within said filter as bubbles to cause vibration of the hollow fiber membranes during the filtering process,

deposits on the outer periphery of said plurality of hollow fiber membranes are removed therefrom by action of the raw fluid and the gas thereby allowing the filtering process to be prolonged.

3. (Canceled)

4. (Currently Amended) A filter device comprising:

a filter cylinder;

a plurality of hollow fiber membranes, each having a bundled end bundled into a bundled-end diameter and a free end, and said free ends arranged to spread within said filter cylinder;
~~wherein the cylinder has an inner diameter between 1.5 and 3 times the bundled end diameter;~~
and

injection means for continuously pressure ejecting raw ~~injecting~~ fluid and gas during a filtering process from ~~[[to]]~~ a central portion of said plurality of hollow fiber membranes and causing the raw fluid and gas to radiate outwardly from the central portion to agitate the hollow fiber membranes;

a funnel member disposed below said plurality of hollow fiber membranes and narrowing in a downward direction; and

a recovery chamber inside the filter cylinder and below the funnel member;

~~wherein the gas floats within said filter cylinder as bubbles and~~ an ejection stream of the raw fluid flutters and spreads said plurality of hollow fiber membranes outwardly, and the gas floats within said filter as bubbles to cause vibration of the hollow fiber membranes during the filtering process;

deposits on the outer periphery of said plurality of hollow fiber membranes are removed therefrom by vibration caused by the fluid and the gas thereby filtering operation period is prolonged,

the deposits thus removed precipitate in the funnel member due to a difference between the specific gravity of the precipitate and the fluid thereby allowing the filtering process to be prolonged.

5. (Previously Presented) A filter device according to claim 4 wherein the recovery chamber is adapted to recover the deposit precipitated in the funnel member.

6. (Canceled)

7. (Currently Amended) A filter device comprising:

a vertically disposed filter cylinder;

a funnel member narrowing in a downward direction and arranged within said filter cylinder;

a filter chamber in said cylinder and disposed above said funnel member;

a recovery chamber in said cylinder and disposed below said funnel member;

a plurality of hollow fiber membranes, each having a bundled end bundled into a bundled-end diameter and a free end, and said free ends arranged to spread flexibly within said filter cylinder, and said plurality of hollow fiber membranes disposed above said filter chamber;
~~wherein the cylinder has an inner diameter between 1.5 and 3 times the bundled end diameter;~~
and

injection means for continuously pressure ejecting raw ~~injecting~~ fluid and gas during a filtering process from ~~[[to]]~~ a central portion of said plurality of hollow fiber membranes and causing the raw fluid and gas to radiate outwardly from the central portion ~~thereby injecting the fluid and gas to an interior of said filter cylinder;~~ and

a backwash chamber disposed above said filter cylinder to temporarily store filtrate fluid permeated through said plurality of hollow fiber membranes,

~~wherein the gas floats within said filter cylinder as bubbles and~~ an ejection stream of the raw fluid flutters and spreads said plurality of hollow fiber membranes outwardly, and the gas floats within said filter as bubbles to cause vibration of the hollow fiber membranes during the filtering process;

deposits on the outer periphery of said plurality of hollow fiber membranes are removed therefrom by action of the raw ~~vibration caused by the~~ fluid and the gas, thereby allowing the filtering process to be prolonged;

the filtrate fluid temporarily stored in said backwash chamber is pressurized to flow into said plurality of hollow fiber membranes and go out from said plurality of hollow fiber membranes into said filter cylinder.

8. (Canceled)

9. (Previously Presented) A filter device according to any one of claims 2, 5, and 7, wherein said injection means is structured with an injection pipe penetrating a bottom surface of said filter cylinder and inserted through a lower end opening of said funnel member to reach the central portion of said plurality of hollow fiber membranes.

10. (Previously Presented) A filter device according to claim 9, wherein the inserted end of the injection pipe is disposed between one-third and two-thirds down the length of the plurality of hollow fiber membranes.

11. (Previously Presented) A filter device according to any one of claims 2, 4, 5, and 7, wherein said injection means injects raw fluid and bubbling air.

12. (Canceled)

13. (Currently Amended) A method of cleaning a filter, comprising:
providing a plurality of hollow fiber membranes in a filter case, the fibers having a first end bundled within a bundling-diameter and a second end that is free;
enabling the free ends to spread within the filter case;
continuously ejecting raw ~~injecting~~ fluid and gas during a filtering process from [[into]] a
central portion of the plurality of hollow fiber membranes;
causing the raw fluid and gas to radiate outwardly from the central portion while
continuing the filtering process;

dislodging deposits from the hollow fiber membranes ~~with the fluid and gas by ejecting a stream of the raw fluid and gas and thereby causing vibration of the hollow fiber membranes;~~

directing the dislodged deposits through a funnel member in the filter case; and
collecting the dislodged deposits in a recovery chamber inside the filter case after directing the dislodged deposits through the funnel member,

wherein an inner diameter of the filter case is 1.5 to 3 times the bundling-diameter.

14. (Currently Amended) A filter device comprising:

a plurality of hollow fiber membranes, having a bundled end bundled into a bundled-end diameter and a free end;

a filter cylinder having an inner diameter between 1.5 and 3 times the bundled end diameter; and

injection means for continuously pressure ejecting raw ~~injecting~~ fluid and gas during a filtering process from ~~[[to]]~~ a central portion of said plurality of hollow fiber membranes and causing the raw fluid and gas to radiate outwardly from the central portion, ~~thereby injecting the fluid and gas to an interior of said filter cylinder under pressure;~~

a funnel member inside the filter cylinder and positioned beneath the plurality of hollow fiber membranes; and

a recovery chamber inside the filter cylinder and below the funnel member,
wherein when in operation the free ends of the hollow fiber membranes spread out into a broom form by the action of the raw fluid and gas.

15. (Previously Presented) The filter device of claim 2 wherein the funnel member defines a lower-end opening that facilitates fluid flow between the recovery chamber and a filter chamber above the funnel member.

16. (Previously Presented) The filter device of claim 15 wherein the injection means is positioned to pass through the recovery chamber, through the lower-end opening and into the filter chamber.

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17. (Currently Amended) The filter ~~member~~ device of claim 2 further comprising a valved pipe coupled to the recovery chamber to facilitate removal of deposits from the recovery chamber.